

Exhibit A

Transmission Systems for Communications

Fifth Edition

Members of the Technical Staff

Bell Telephone Laboratories

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Chapter 1

The Communications Network

A transmission system in its simplest form is a pair of wires connecting two telephones. More commonly, a transmission system is a complex aggregate of electronic gear and the associated medium, which together provide a multiplicity of channels over which many customers' messages and associated control signals can be transmitted.

In general, a call between two points will be handled by connecting a number of different transmission systems in tandem to form an overall transmission connection between the two points. The way in which these paths are chosen and interconnected has a strong bearing on the characteristics required of each system. Each element in the connection may interact with other elements to add costs or introduce impairments to the overall connection. It follows that the relationship between performance and cost of a transmission system cannot be considered in terms of that system alone but must also be viewed with respect to the relation of the system to the building up of a complete connection.

To provide the service which permits people or machines to talk to each other at a distance, the telephone system must supply the means and facilities for connecting the particular customer stations at the beginning of the call and disconnecting them when the call is completed. Switching, signaling, and transmission functions are involved. The switching function includes identifying and connecting the customers to a suitable transmission path. The signaling function involves supplying and interpreting the control and supervisory signals needed to perform this operation. The transmission aspect, which is the concern of this text, deals with the transmission of the customer's message and these control signals.

The design of new transmission systems is constrained by the fact that they must be compatible with an existing multibillion dollar plant